FAST FACTS
AMMONIA

Missouri Department of Health and Senior Services
Hazardous Substance Emergency Events Surveillance (HSEES) Program

Synonyms: Anhydrous ammonia

CAS Number: 7664-41-7

DOT Numbers: UN1005 (anhydrous)
UN2073 (solution)
UN2672 (solution)

DOT Designation: Nonflammable gas

Hazard Rating	NFPA
HEALTH	3
FLAMMABILITY	1
REACTIVITY	0
• Containers may explode in fire • Corrosive • Water reactive	

Hazard Rating Key:
0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

Exposure Levels

- Nose and throat irritation has been reported at 72 parts per million (ppm) after 5 minutes of exposure. Exposures of 500 ppm for 30 minutes have caused upper respiratory irritation, tearing, increased pulse rate and blood pressure. Death has been reported after an exposure to 10,000 ppm for an unknown duration.
- Solutions of 2% ammonia can cause burns and blisters after 15 minutes of exposure.
- Levels of 70 ppm (gas) have caused eye irritation. If not flushed with water immediately, contact with the eye may cause partial or complete blindness.
- Ammonia will cause pain if swallowed, and burning of the throat and stomach. One teaspoon of 28% aqua ammonia can cause death.

Characteristics and Potential Exposures

Ammonia is a colorless, strongly alkaline, and extremely soluble gas with a characteristic pungent odor. Ammonia is used in the production of ammonium sulfate and ammonium nitrate for fertilizers and in the manufacture of nitric acid, sodium carbonate, synthetic urea, synthetic fibers, dyes, and plastics. It is also utilized as a refrigerant, and in the petroleum refining and chemical industries. It is used in the production of many drugs and pesticides. Large quantities of ammonia are located in agricultural fertilizer tanks and agricultural chemical supply stores. Ammonia is also used in many common household-cleaning products.

Ammonia Releases in Missouri

During calendar years 1994-1998, 1,071 HSEES events were reported in Missouri. Of those, 136 events involved ammonia or ammonia compounds. Quantities released ranged from 5 ounces to 30,000 gallons, and from 10 to 5,000 pounds. Fixed facilities were involved in 114 of these events, while 23 occurred during transport. Injuries were sustained by 29 people during 14 events, and one individual died. Evacuations were ordered in 28 events and resulted in the evacuation of over 4,100 people. Ammonia was the most frequently released hazardous substance in Missouri during this period.

Interesting Event

An individual was driving a car on an interstate highway. The passenger was holding a makeshift canister of anhydrous ammonia on his lap. The container exploded, resulting in the passenger's death. The driver suffered severe injuries and was hospitalized for seven days. One firefighter, one emergency medical technician and one individual from the general public, all of whom stopped to help, were also injured. The cause of the smoke emanating from the car was not immediately known when these individuals pulled the driver and passenger away from the car. It was later determined the ammonia was to be used for methamphetamine production.

Health Hazard Information

- Contact with anhydrous liquid ammonia is intensely irritating to the mucous membranes, eyes and skin and may cause corrosive burns of the skin or blister formation.
- Ammonia can cause severe burns of the eyes, leading to permanent damage.
- Breathing ammonia can irritate the mouth, nose and throat. Higher levels may irritate the lungs, causing coughing and/or shortness of breath. Very high exposures can cause a buildup of fluid in the lungs (pulmonary edema), which can result in death.
- Exposure may cause headaches, nausea and vomiting.

Personal Protective Equipment Guidelines

- Appropriate protective clothing should be worn to prevent any possible skin contact with liquids of >10% content, or reasonable probability of contact with liquids of <10% content.
- Wear eye protection to prevent any possibility of eye contact with liquids of >10% NH_3 content.
- When the potential exists for exposures over 25 ppm, use a National Institute for Occupational Safety and Health (NIOSH) approved full facepiece respirator with an ammonia vapor cartridge/canister. More protection is provided by a powered-air purifying respirator.

Handling and Storage

- Ammonia must be stored to avoid contact with strong oxidizers, chlorine, bromine, iodine, acids, gold, mercury, silver, calcium, and hypochlorite bleaches, since violent reactions occur.
- Store ammonia in tightly closed containers in a cool, well-ventilated area away from direct heat and sunlight.
- Sources of ignition such as smoking and open flames are prohibited where ammonia is used, handled or stored in a manner that could create a potential fire or explosion hazard.

Spills and Emergencies

- Most environmental emergencies involve spills of hazardous materials that must be reported to the Department of Natural Resources through a 24-hour hotline (573-634-2436). When reporting a spill, callers can also obtain technical assistance regarding response, containment and cleanup of hazardous materials.
- Restrict persons not wearing protective equipment from areas of spills or leaks until cleanup is complete.
- Evacuate area endangered by gas. In case of a spill or leak from a drum or smaller container, or a small leak from a tank, isolate 80 feet in all directions.
- In case of a large spill from a tank or many containers, first isolate 160 feet in all directions, then evacuate in a downwind direction an area 0.4 miles wide and 0.6 miles long.
- Remove all ignition sources.
- Ventilate the area of the spill or leak.
- Stop the flow of gas. If the source of the leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair the leak or allow the cylinder to empty.

Disposal Methods

Dilute with water, neutralize with hydrochloric acid and discharge to sewer. Recovery is an option to disposal which should be considered for paper manufacture, textile treating, fertilizer manufacture and chemical process wastes.

Fire Extinguishing

Small fires: Use dry chemical or carbon dioxide.

Large fires: Use water spray, fog or foam. Apply water gently to the surface. Do not get water inside container. Move container from fire area if you can do so without risk. Stay away from ends of tanks. Cool containers that are exposed to flames with water from the side until well after the fire is out.

Emergency First Aid Measures

Eye Contact

- Immediately flush with large amounts of water. Continue for at least 30 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

- Quickly remove contaminated clothing. Immediately wash skin with large amounts of water. Seek medical attention immediately.

Respiratory

- Remove the victim from the site of the release.
- Begin rescue breathing if breathing has stopped, and CPR if heart activity has stopped.
- Transfer the victim promptly to a medical facility. Observation after high exposure is recommended for up to three days, as fluid in the lungs may be delayed.

For more information on the Missouri HSEES program, visit the web site at www.dhss.state.mo.us/hsees or contact the HSEES Coordinator at 573-526-1686.

Information for this fact sheet was obtained from the Missouri HSEES Program Five-Year Data Analysis; the Environmental Protection Agency (EPA); the Agency for Toxic Substances and Disease Registry (ATSDR); and the Handbook of Toxic and Hazardous Chemicals and Carcinogens, Third Edition.

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THIS FACT SHEET DOES NOT REPLACE THE MATERIAL SAFETY DATA SHEET (MSDS) REQUIRED FOR A HAZARDOUS CHEMICAL UNDER THE OCCUPATIONAL HEALTH AND SAFETY ACT OF 1970 (29 U.S.C. 651 ET SEQ.) AND REGULATIONS PROMULGATED UNDER THIS ACT.